

STATUS OF CERTAIN FROGS OF THE GENUS *COLOSTETHUS*, WITH DESCRIPTIONS OF NEW SPECIES

By PHILIP A. SILVERSTONE¹

ABSTRACT: Three new species of dendrobatid frogs are described from Antioquia, Colombia: *Colostethus ramosi*, *C. lehmanni*, and *C. fraterdanieli*. Lectotypes are designated for *C. pratti* (Boulenger), 1899 and *C. kingsburyi* (Boulenger), 1918. The holotype of *Dendrobates ranoides* Boulenger, 1918 is a *Colostethus*, specifically distinct from *C. brunneus* (Cope), 1887.

The dendrobatid genus *Colostethus* is one of the largest and poorly known groups of frogs in the Neotropics. During the course of my work with frogs of the genus *Dendrobates*, I had the opportunity to study frog populations referable to *Colostethus* in Colombia and to examine extant types for most of the nominal species. Some of the results of these observations are presented here in an attempt to clarify the status of some populations and names.

Three populations encountered in Colombia represent currently unrecognized species, and I propose they be named as follows:

Colostethus ramosi, new species

Figure 1

Holotype.—LACM 44147, Colombia: *Antioquia*: Alto de la Honda (hill near San Rafael), 1240 m; collected 8 June 1968 by P. A. Silverstone, J. E. Ramos, and C. Jiménez.

Topoparatype.—LACM 44148.

Diagnosis.—*Colostethus ramosi* differs from other species of the genus in the following combination of characters: complete light lateral diagonal stripe from groin to eye; venter lacking spotting or marbling; third finger of male not swollen; no light vertebral stripe; no toe webbing; throat of male dark; and no dark longitudinal line on anterior surface of thigh.

Description of holotype.—Adult female, 20 mm snout-vent length; skin smooth, except slightly granular on posterior belly; first finger equal to second; tarsal fold present; tarsal tubercle present; digits lack webbing and fringes; maxillary and premaxillary teeth present, no vomerine teeth; posterodorsal portion of tympanum concealed; diameter of eye 1.7 times diameter of tympanum; diameter of eye greater than distance from eye to nostril; snout sub-

¹Research Associate in Herpetology, Los Angeles County Museum of Natural History.

truncate in dorsal aspect, rounded in lateral aspect; canthus rostralis rounded; interorbital space 1.7 times diameter of upper eyelid. Color in life: iris black with gold ring around pupil; head and back dull brown; no dorsolateral stripes; sides of head and body black, crossed by complete gold diagonal lateral stripe from groin to eye, along canthus rostralis, and around snout tip; white ventrolateral stripe (disappears in preservative) from hind limb insertion along upper lip to snout tip; dorsal surface of hind limbs dull orange, of forelimbs gold; light area subtended by brown mottling on posterior surface of thigh; longitudinal dark brown stripe on anterior surface of upper arm, posterior



FIGURE 1. *Colostethus ramosi*, holotype (LACM 44147).

surface of forelimb, and dorsal surface of thigh, but not on anterior surface of thigh; ventral surface of limbs dull orange; throat, chest, and belly yellowish white, latter with metallic gold tinge.

Paratype.—Adult male, 18.5 mm snout-vent length; third finger not swollen; similar to female, except (in life) forelimb brown above and gray below, throat and chest dark gray, and ventrolateral stripe broken into white spots posterior to forelimb insertion.

Habits and habitat.—Males were heard calling on fallen leaves on ground in second growth forest and in tall grass on slope near forest, not near water. Call consisted of one note, repeated one minute or more, averaging 86 notes per minute, and 1.4 notes per second. Specimens were taken between 0800 and 1030 hrs. Mean annual temperature at San Rafael reported as 23° C

(Colombian Dept. of Statistics), and thus is drier and warmer than Santa Rita (collecting site for following two species).

Type locality.—San Rafael is 16 km east of Guatapé, on Guatapé-Río Magdalena highway.

Etymology.—Named after Jorge Eduardo Ramos P. of Cali, Colombia.

Colostethus lehmanni, new species

Figure 2

Holotype.—LACM 44156, Colombia: *Antioquia*: Santa Rita (near Río Nare), 1890-1910 m; collected 9 June 1968 by P. A. Silverstone and J. E. Ramos.

Topoparatypes.—LACM 44154-55, 44157-61.

Diagnosis.—*Colostethus lehmanni* differs from other species of the genus by the following combination of characters: complete light lateral diagonal stripe from groin to eye; venter lacking spotting or marbling; third finger of male not swollen; no light vertebral stripe; no toe webbing; throat of male often bearing a vague dull wash of gray, but not being conspicuously dark, and thus not contrasting with a light venter as in *ramosi*; dark longitudinal line on anterior surface of thigh present.

Description of holotype.—Adult male, 18 mm snout-vent length; third finger, not swollen; skin smooth except few tubercles on posterior back and dorsal surface of hind limbs; first finger equal to second; tarsal fold present; tarsal tubercle present; digits lack webbing and fringes; maxillary and premaxillary teeth present, no vomerine teeth; posterodorsal portion of tympanum concealed; diameter of eye twice diameter of tympanum; diameter of eye greater than distance from eye to nostril; snout subtruncate in dorsal aspect, rounded in lateral aspect; canthus rostralis rounded; interorbital space 1.7 times diameter of upper eyelid. Color in life: iris black; head and back brown; no dorsolateral stripes; upper sides of head and body black, crossed by complete gold diagonal lateral stripe from groin to eye, along canthus rostralis, and around snout tip; lower sides of body brown with white spots; light upper lip stripe; dorsal surface of limbs brown, banded darker brown; dark brown longitudinal stripe on anterior surface of thigh and upper arm; light longitudinal stripe on posterior surface of thigh, subtended by brown mottling; ventral surface grayish, except belly yellowish; ventrodorsal upper arm and ventroproximal forearm dark, former swollen.

Paratypes.—Snout-vent length in mm (average in parentheses): five adult males: 15.5-18 (16.7); two juveniles: 9.5-14.5; LACM 44154-55, 44157-58 similar to holotype, but 44154 paler, 44155 lacks white spots on lower sides, 44158 lacks dark swollen areas on ventral surface of forelimb, and 44157 has dark markings on back; some individuals lack posterior thigh stripe; some have slightly granular belly; LACM 44159-61 have lighter ground color than holotype, shorter snout, dark back markings, second, lower light



FIGURE 2. *Colostethus lehmanni*: left, paratype (LACM 44160); right, holotype (LACM 44156).

lateral stripe, dark mottling on upper lip, and lack dark swollen areas on ventral surface of forelimb; LACM 44157 is transitional, with dark ground color as in holotype, but also dark spots on upper lip and dark median back stripe ending anteriorly in Y-mark, as in LACM 44159, which has light ground color.

Habits and habitat.—Specimens were taken on moist ground between 0600 and 1330 hrs in disturbed, primary forest. The habitat contained abundant mosses, palms, and bromeliads. Mean annual rainfall 5000 mm, mean annual temperature 20°, maximum 30°, minimum 10-12° C (Empresas Municipales, Medellín).

Type locality.—Santa Rita is a dam-site on Río Nare, on road north from San Rafael-Guatapé highway, near Guatapé.

Etymology.—Named after F. Carlos Lehmann V. of Cali, Colombia.

Colostethus fraterdanieli, new species

Figure 3

Holotype.—LACM 44164, Colombia: *Antioquia*: Santa Rita (near Río Nare), 1890-1910 m; collected 9 June 1968 by P. A. Silverstone and J. E. Ramos.

Paratypes.—All from Colombia: LACM 44165-69, topoparatypes; AMNH 39179, 39187, 39189, 39195, 39198, and five untagged, *Antioquia*:

Medellín; USNM 150715-17; "Caldas: Montañita" (east of Río Cauca, between Salamina and San Félix, 2300-2400 m, *fide* Rvdo. Hno. Nicéforo María); USNM 150718, "Caldas: 9 km east of Santa Rosa de Cabal" (Santa Rosa de Cabal is southwest of Manizales, on Manizales-Pereira road, elevation at collecting site is 2000-2500 m, *fide* Rvdo. Hno. Nicéforo María).

Diagnosis.—Differs from *C. nubicola* in larger size and basal toe webbing (none in *C. nubicola*); differs from *C. infraguttatus* in basal toe webbing (none in *C. infraguttatus*) and ventral pattern dark spots on light ground (light spots on dark ground in *C. infraguttatus*); differs from *C. subpunctatus* in having swollen third finger in males; differs from *C. kingsburyi* in having basal toe webbing and complete light lateral stripe, and lacking light ventrolateral stripe (*C. kingsburyi* lacks toe webbing and has dorsolateral and ventrolateral stripes); differs from other *Colostethus* in having complete light lateral stripe, basal toe webbing, and males with swollen third finger and dark ventral spotting.

Description of holotype.—Adult male, 23 mm snout-vent length; head relatively broad; third finger swollen; skin smooth except few tubercles on



FIGURE 3. *Colostethus fraterdanieli*, holotype (LACM 44164).

posterior back; first finger slightly shorter than second; tarsal fold present; tarsal tubercle present; fingers lack webbing and fringes, toes basally webbed but little or no fringing, webbing formula (Savage and Heyer, 1967) I 2-3

II 2-3.5 III 3-4 IV 4.3-3 V; maxillary and premaxillary teeth present, no vomerine teeth; posterodorsal portion of tympanum concealed; diameter of eye twice diameter of tympanum; diameter of eye greater than distance from eye to nostril; snout rounded in dorsal and lateral aspects; canthus rostralis rounded; interorbital space twice diameter of upper eyelid. Color in life: iris black with gold ring around pupil; head and back light brown; no dorsolateral stripes; sides of head and body dark brown, olive posterolaterally; interorbital area and partial median back stripe darker brown than rest of dorsum; complete diagonal lateral gold stripe from groin to eye, along canthus rostralis, and around snout tip; groin, axilla, and posterior tip of lateral stripe yellow; upper lip stripe and diagonal stripe from eye to forelimb insertion gold; dorsal surface of forelimbs orange, of hind limbs yellow-orange with brownish cast; posterior surface of thigh has narrow, wavy yellow-orange stripe subtended by mottling of yellow-orange and dark brown; dark brown longitudinal stripe on anterior and posterior surfaces of forelimb and anterior and posterodorsal surfaces of thigh; dorsal surface of tibia banded dark brown; ventral surface of limbs yellow-orange with brownish cast; throat, chest, and belly yellowish white.

Paratypes.—Snout-vent lengths in mm (average in parentheses): seven adult males: 20.5-24 (22.3); eight adult females: 24-27 (25.8); 15 adults: 20.5-27 (24.2); five juveniles: 16-22; third finger of males swollen, of females not swollen; prominent tubercles on posterior back except in LACM 44166-69; female USNM specimens have no ventral spotting, males have small dark spots on throat and chest; AMNH females vary from heavy ventral spotting (39187) to few dull spots, males have dark spotting on chest and anterior belly and marbling on throat; LACM specimens have dull spotting on throat and chest only, darker in males than in females, but not as dark as in USNM and AMNH specimens; posterior thigh pattern in AMNH specimens similar to that in holotype, but light stripe sometimes broken into row of spots; in USNM specimens, posterior light thigh stripe conspicuous against dark brown background; all specimens have dark brown interorbital area, contrasting with lighter brown back color; AMNH specimens have small dark spots on back.

Etymology.—Named after Reverendo Hermano Daniel of the Christian Brothers.

The type series of the following two taxa contain more than one species. In order to facilitate future work, I propose here to make the taxa objective by designating lectotypes.

Colostethus pratti (Boulenger)

Phyllobates pratti Boulenger, 1899: 274-275, pl. 11, Fig. 3.

Type material.—Two syntypes, BM 1947.2.13.94-95, includes two species. I designate BM 1947.2.13.94 (figured by Boulenger), 20 mm female, Colombia: Santa Inés, north of Medellín, 3800 ft (1159 m), collected by A. E. Pratt,

as lectotype of *Phyllobates pratti* Boulenger. It has incomplete light lateral stripe. BM 1947.2.13.95 differs from lectotype in having complete light lateral stripe (i.e., stripe reaches eye anteriorly).

Colostethus kingsburyi (Boulenger)

Phyllobates kingsburyi Boulenger, 1918: 427-428.

Type material.—Four syntypes, BM 1947.2.14.3-6, includes two species; BM 1947.2.14.3 is not conspecific with other three and does not agree with Boulenger's original description. It has basal toe webbing, complete light lateral diagonal stripe, and is fat-bodied; the other three specimens lack toe webbing, have ventrolateral stripes, and are relatively narrow-bodied. I designate BM 1947.2.14.5, 25 mm female, Ecuador: El Topo, Río Pastaza, 4200 ft (1281 m), collected 1912 by M. G. Palmer, as lectotype of *Phyllobates kingsburyi* Boulenger.

After examining the type, I propose the following new combination:

Colostethus ranoides (Boulenger)

Dendrobates ranoides Boulenger, 1918: 428-429.

Type material.—I agree with Dunn (1957) that the holotype, BM 1947.2.-15.35, Colombia: Villavicencio, Guatiquia River, 400 ft (122 m) has teeth and is not *Dendrobates*. It is *Colostethus*, but not *C. brunneus* (Cope), 1887, as currently considered. The type material of *C. brunneus* (ANSP 11241-61) is in such poor condition that it is useless for comparison. Topotypes of *C. brunneus* (KU 93154-55) have immaculate venter and dorsolateral stripe. The holotype of *C. ranoides* differs from these topotypes in having spotted venter and complete light lateral diagonal stripe.

ACKNOWLEDGEMENTS

I thank J. M. Savage and I. R. Straughan, University of Southern California and J. W. Wright, Los Angeles County Museum of Natural History (LACM) for criticizing the manuscript. I thank the following for permission to examine specimens in their charge: A. G. C. Grandison and staff, British Museum (Natural History, BM); J. W. Wright and A. H. Brame, Jr. (LACM); J. A. Peters and staff, United States National Museum (USNM); R. G. Zweifel and C. W. Myers, American Museum of Natural History (AMNH); W. E. Duellman, University of Kansas Museum of Natural History (KU); and J. E. Böhlke and E. V. Malnate, Academy of Natural Sciences of Philadelphia (ANSP). Rvdo. Hno. Nicéforo María, Instituto de La Salle, Bogotá provided information on localities. J. E. Ramos P., H. Trapido, R. Díaz V., Universidad del Valle, Cali, F. Carlos Lehmann V., Museo Departamental de Historia Natural, Cali, and Rvdo. Hno. Daniel and colleagues, Colegio San José, Medellín facilitated my work in Colombia in 1968. Studies were partially aided by a National Defense Education Act Title IV

Fellowship and by Biomedical Sciences Support Grant FR-07012-02 from the National Institute of Health.

RESUMEN

Se describen tres nuevas especies de ranas (Dendrobatidae) procedentes de Antioquia, Colombia. *Colostethus ramosi*, *C. lehmanni*, y *C. fraterdanieli*. Tanto los sintipos de *C. pratti* (Boulenger) como los de *C. kingsburyi* (Boulenger) representan dos especies; por consiguiente se designa un lectotipo de cada serie. De acuerdo con Dunn (1957), el holotipo de *Dendrobates ranoides* Boulenger es un *Colostethus* con dientes; este nombre no es un sinónimo de *C. brunneus* (Cope) como ha sido considerado, sino que representa una especie distinta.

LITERATURE CITED

- BOULENGER, G. A. 1899. Descriptions of new batrachians in the collection of the British Museum Natural History). Ann. Mag. Nat. Hist., Ser. 7, 3: 273-277.
- . 1918. Descriptions of new South-American batrachians. Ann. Mag. Nat. Hist., Ser. 9, 2: 427-433.
- COPE, E. D. 1887. Synopsis of the Batrachia and Reptilia obtained by H. H. Smith, in the province of Mata Grosso, Brazil. Proc. Am. Phil. Soc. 24: 44-60.
- DUNN, E. R. 1957. Neotropical frog genera: *Prostherapis* vs. *Hyloxalus*, with remarks on *Phyllobates*. Copeia 1957: 77-78.
- SAVAGE, J. M., AND W. R. HEYER. 1967. Variation and distribution in the tree-frog genus *Phyllomedusa* in Costa Rica, Central America. Beitr. Neotrop. Fauna 5: 111-131.

Accepted for publication July 9, 1970